

Implementation of safe heart for monitoring patient condition

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Abstract: The aim of the safe heart is to monitor the heart beat or heart pulse rate of the individual and if any irrespective changes in the heart beat or pulse rate then the device intimates the person who is taking care of the patient that the particular person is facing with the low or high heart pulse rate .so, that the patient is taken to the hospital or provided medicines to control the situation.

Here the major role of the project is played by the "Heart pulse detection sensor" it monitors the heart beat or the pulse rate of the heart regularly i.e.,24/7.

Safe heart is the device which is specially designed for the cardio patients. The patient who is suffering with cardio problem should be monitored regularly and he needs a check up regularly. So, our device works in the way that it monitors the heartbeat of the patient and it intimates the person who takes care of the patient via SMS, if the heartbeat of the patient increases or decrease to the default level which is setup while fixing the device. The device also consists of "GPS tracking system". The device is controlled with a mobile application.

Keywords : Pulse rate, Pulse detection sensor probe, Mobile application

1.INTRODUCTION

Heart disease shares a major part of the global burden of lifestyle diseases. Earlier, non-modifiable factors like age, gender, family history were mainly responsible for heart disease. But over the past few decades, heart disease seems to have surpassed all the boundaries and now controllable risk factors like diet, physical inactivity and stress largely determine the risk of heart disease. Here are some facts highlighting the dramatic rise in heart disease cases in India. In India, out of the estimated population of more than 1.27 billion dispersed across various geographical regions, about 45 million people suffer from coronary artery disease. 'According to current estimates, India will soon have the highest number of cases of cardiovascular disease in the world,' says **Dr Nikhil Kumar, Director, Cardiology, Fortis Memorial Research Institute, Gurgaon**. It is estimated to account for 35.9% deaths by the year 2030.

Heart disease has escalated among the younger generation with a significant risk in both males and females. 'More and more number of young Indians are suffering from coronary artery disease, owing to their poor lifestyle, and if this continues the future looks even more dangerous,' says Dr Kumar. 'Five years ago, we hardly saw young patients with heart problems. Now, we get many cases where people in the 25-35 age group are diagnosed with heart disease' said Dr Ajay Chaurasia, head of cardiology department, BYL Nair Hospital stated in the Saffola Life study.

Hypertensive heart disease, among other CVDs, is a significant problem in India, with 261 694 deaths in 2013; this is an increase of 138% in comparison with the number of deaths in 1990. Rheumatic heart disease also continues to be a problem in several parts of India, with an estimated 88 674 deaths (7 per 100 000 population) in the year 2010. Reliable national-level data on the rheumatic heart disease burden are not available from India because of the differences in definitions used in existing studies. However, the available estimates suggest that rheumatic heart disease prevalence is in the range of 1.5 to 2 per 1000 individuals (2–2.5 million cases in absolute numbers)

Generally people suffers with many diseases, among all of the diseases cardio is the major one which can take the lives at any instant of the time .If the person suffering from the cardio problem is alone, there won't be any intimation to the person who is taking care of the patient that he is going through like bad pulse rate, increase in chest pain, low oxygen consumption and he can't be taken to any medical treatment on time.

So, for that problem we came up with a device which monitors the heart beat or heart pulse rate regularly i.e.,24/7.this device monitors the heart

beat or heart pulse rate if any irregular changes taken place in the heart beat or pulse rate the SMS alert will be sent to the numbers which were already saved in the device, the location of the person can also be traced via Gps provided, the monitored data is stored in the cloud with the help of the mobile application and the mobile application consists of the entire health data of the patient or the user. The details of the hospitals in a certain area will also be stored in the mobile application.

II .PULSE SENSOR

Heart rate data can be really useful whether you're designing an exercise routine, studying your activity or anxiety levels or just want your shirt to blink with your heart beat. The problem is that heart rate can be difficult to measure. Luckily, the Pulse Sensor Amped can solve that problem!

The Pulse Sensor Amped is a plug-and-play heart-rate sensor for Arduino, Teensy and other microcontrollers. It can be used by students, artists, athletes, makers, and game & mobile developers who want to easily incorporate live heart-rate data into their projects. It essentially combines a simple optical heart rate sensor with amplification and noise cancellation circuitry making it fast and easy to get reliable pulse readings. Also, it sips power with just 4mA current draw at 5V so it's great for mobile applications.

Simply clip the Pulse Sensor to your earlobe or finger tip and plug it into your 3 or 5 Volt microcontroller and you're ready to read heart rate! The 24" cable on the Pulse Sensor is terminated with standard male headers so there's no soldering required. Of course Arduino example code is available as well as a Processing sketch for visualizing heart rate data.

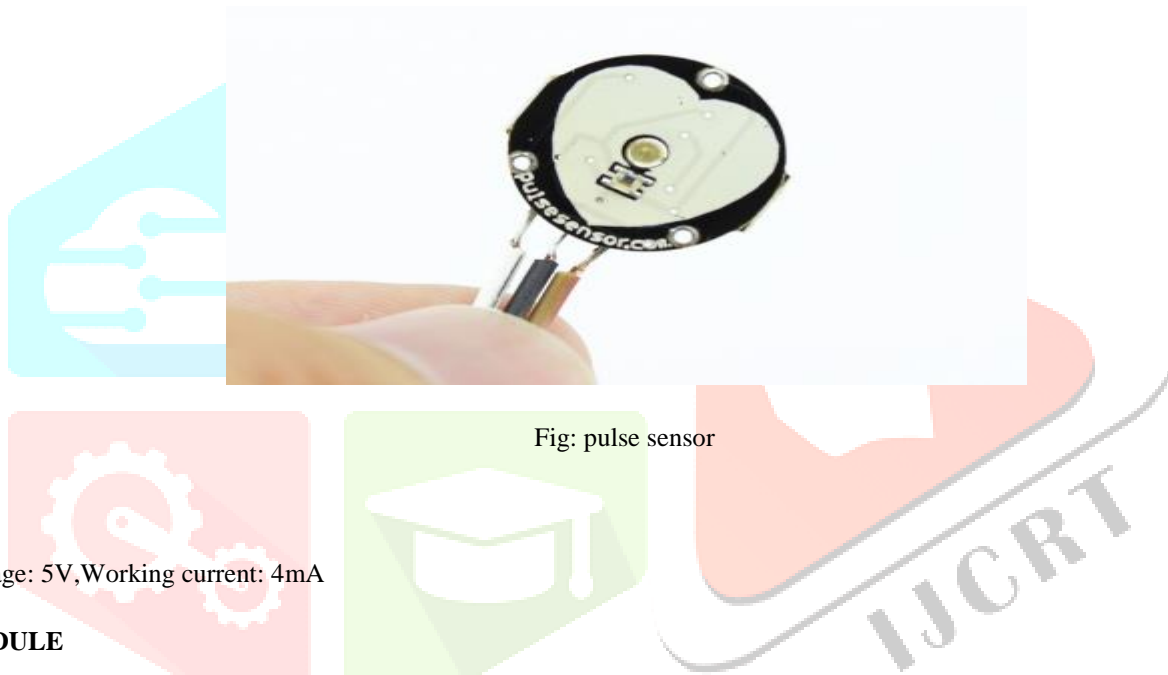


Fig: pulse sensor

Features:

Working voltage: 5V, Working current: 4mA

III.GPS MODULE

A **GPS navigation device**, **GPS receiver**, or simply **GPS** is a device that is capable of receiving information from GPS satellites and then to calculate the device's geographical position. Using suitable software, the device may display the position on a map, and it may offer directions. The Global Positioning System (GPS) uses a global navigation satellite system (GNSS) made up of a network of a minimum of 24, but currently 30, satellites placed into orbit by the U.S. Department of Defense.

The GPS was originally developed for use by the United States military, but in the 1980s, the United States government allowed the system to be used for civilian purposes. Though the GPS satellite data is free and works anywhere in the world, the GPS device and the associated software must be bought or rented.

A GPS device can retrieve from the GPS system location and time information in all weather conditions, anywhere on or near the Earth. A GPS reception requires an unobstructed line of sight to four or more GPS satellites, and is subject to poor satellite signal conditions. In exceptionally poor signal conditions, for example in urban areas, satellite signals may exhibit multipath propagation where signals bounce off structures, or are weakened by meteorological conditions. Obstructed lines of sight may arise from a tree canopy or inside a structure, such as in a building, garage or tunnel. Today, most standalone GPS receivers are used in automobiles. The GPS capability of smartphones may use assisted GPS (A-GPS) technology, which can use the base station or cell towers to provide the device location tracking capability, especially when GPS signals are poor or unavailable. However, the mobile network part of the A-GPS technology would not be available when the smartphone is outside the range of the mobile reception network, while the GPS aspect would otherwise continue to be available.

The Russian Global Navigation Satellite System (GLONASS) was developed contemporaneously with GPS, but suffered from incomplete coverage of the globe until the mid-2000s. GLONASS can be added to GPS devices to make more satellites available and enabling positions to be fixed more quickly and accurately, to within 2 meters.

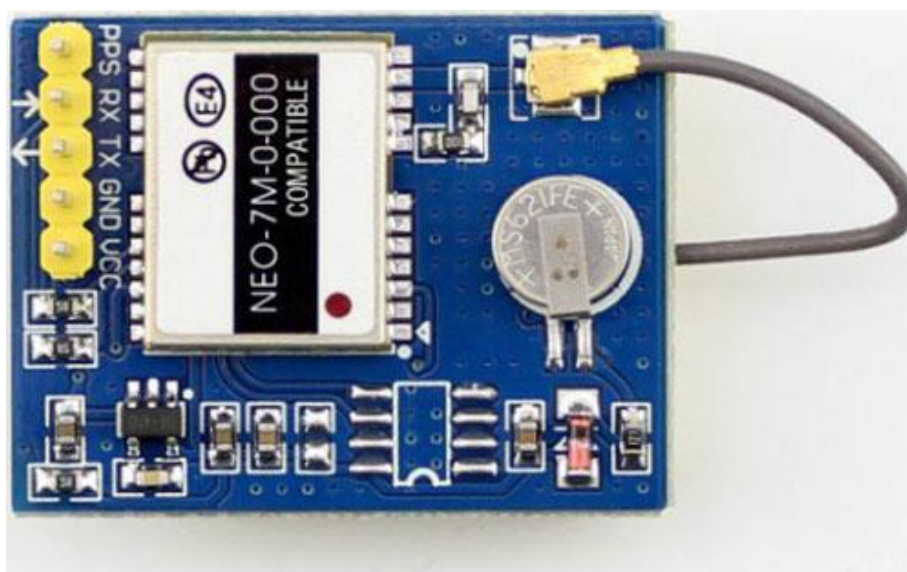


Fig: Gps module

IV. Gsm module

GSM is a mobile communication modem; it stands for global system for mobile communication (GSM). The idea of GSM was developed at Bell Laboratories in 1970. It is widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands.

GSM system was developed as a digital system using time division multiple access (TDMA) technique for communication purpose. A GSM digitizes and reduces the data, then sends it down through a channel with two different streams of client data, each in its own particular time slot. The digital system has an ability to carry 64 kbps to 120 Mbps of data rates.



Fig: GSM module

Features of GSM Module:

- Improved spectrum efficiency
- International roaming
- Compatibility with integrated services digital network (ISDN)
- Support for new services.
- SIM phonebook management
- Fixed dialing number (FDN)
- Real time clock with alarm management
- High-quality speech
- Uses encryption to make phone calls more secure
- Short message service (SMS)

The security strategies standardized for the GSM system make it the most secure telecommunications standard currently accessible. Although the confidentiality of a call and secrecy of the GSM subscriber is just ensured on the radio channel, this is a major step in achieving end-to-end security.

V. Results and conclusions

Device is implemented to monitor the heart beat or pulse rate of the human. So, that the deaths due to cardiac arrest , low or high B.P. gets controlled for some extent.

VI. Future scope

As this device is used mainly by the patients who are suffering with heart related problems and by developing our mobile application with hospitals ,doctors details we will have a better market.

VII. References

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